

**Attachment 9. Economic Analysis – Water Quality and Other Expected Benefits**  
**Rancho Palos Verdes**  
**San Ramon Canyon Stormwater Flood Reduction Project**

**The Future Without the Project vs. the Future With the Project**

*Note to evaluator: Please refer to Attachments 3 and 7 for a detailed description of the background, proposed project, detailed budget, maps, and visuals of the project site. For sake of brevity, a comprehensive narrative is not repeated here.*

**Summary Background and Project Description**  
(please see Attachments 3 and 7 for comprehensive narratives)

San Ramon Canyon is a natural, typically dry canyon streambed in the City of Rancho Palos Verdes that sits directly north of and above Palos Verdes South (PVDS)/25<sup>th</sup> Street in the City of Los Angeles. It is surrounded by residential homes to the north, Friendship Park to the east, Palos Verdes Drive East (PVDE) switchbacks to the west, and PVDS/25<sup>th</sup> Street and 242 mobile homes to the south. Since the 2005 storm events, the canyon has been eroding at an accelerated and alarming rate. During moderate to severe rain events, the canyon conveys storm water runoff generated from the upstream tributary watershed approximately 3,300 feet downstream. It is then directed to a storm drain inlet system at PVDS/25<sup>th</sup> Street, constructed over 50 years ago, that can now no longer accommodate the water delivered to it. Floodwater, mud and debris overwhelm the inlet and spill out onto 25<sup>th</sup> Street, blocking traffic and requiring repeated efforts by the City of Rancho Palos Verdes and the City of Los Angeles to clean up the area. The mud and debris flows, and the resulting cleanup efforts, severely restrict access to the area for both motorists and safety/emergency personnel.

The proposed project consists of the construction of a mid-canyon inlet structure, located slightly upstream of the upper switchback along PVDE and the highly-erodible section of the canyon. The inlet structure is connected to shoreline outfall with a 3,900-foot long, 54-inch pipe in a “tunnel alignment” that outlets below the oceanfront bluffs. The entire length of this storm drain (SD) alignment falls within the City of Rancho Palos Verdes (RPV) allowing RPV sole jurisdiction.

Furthermore, the alignment is almost entirely within city-owned land, requiring only small maintenance and construction easements. The inlet structure will be located in the “middle” of San Ramon Canyon, which will intercept flood waters north of the Tarapaca Landslide. The storm drain conveys flows from the inlet structure southwesterly through a tunnel approximately 1,900-feet in length to a point just south of PVDS. From there, the next 1,700-feet of the pipeline will



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be constructed, using the standard open trench (cut and cover) type of construction running parallel to the City boundary adjacent to Palos Verdes Shores Mobile Home Park in the City of Los Angeles. The pipe will be installed within an existing dedicated 100-foot-wide utility easement within Palos Verdes Shoreline Park that was specifically set aside for utilities such as this proposed storm drain. The 100-foot-wide easement has less strict environmental impact mitigation requirements, serves as a firebreak for the adjacent mobile home park, and includes an informal hiking trail to the ocean, which will be further enhanced by this project. The final 300-feet of pipe from the bluff top to the beach will run in a 38% sloped "slant drain" tunnel to an outlet structure located at the base of the bluff. The portion of the canyon downstream of the mid-canyon inlet structure, which runs through the Tarapaca landslide, will be back-filled up to 30-feet deep with dirt. This gravity buttress will restore the streambed to its former elevation, and will stabilize both the canyon side slopes. This portion of the canyon would convey side slope run-off along an engineered, vegetated, predominantly soft-bottom creek bed. An access road from PVDE along the westerly side of the canyon would be constructed adjacent to the creek bed to provide access for maintenance of the upstream inlet structure.

The following water quality and other expected benefits will be realized as a result of implementing the San Ramon Canyon Stormwater Flood Reduction Project:

Quantitative "Other Expected Benefits:"

- Prevent reconstruction of PVDE switchbacks (lower and upper)
- Avoided debris clean up
- Eliminate excessive road repaving and restoration on PVDS/25<sup>th</sup> Street
- Avoided sewer failure and associated fines

***It should be noted that the above expected benefits were discussed with the staff at the State DWR office and it was determined that these benefits should be computed using Table 19.***

Qualitative Water Quality and "Other Expected Benefits:"

- Improved water quality
- Ecosystem restoration and enhanced open space/recreational use
- Improved traffic circulation and commute time during storm events
- Improved response time for first responders during storm events
- Potential reduction in Tarapaca Landslide movement

The following analysis is provided for each benefit listed above.

**Quantitative Other Expected Benefits**

**1. Prevent Reconstruction of PVDE Switchbacks (lower and upper)**

As mentioned in the summary above, San Ramon Canyon is eroding at an alarming rate. According to data collected during the development of the Project Study Report (PSR), the Canyon's edge is now only 86 feet from one of two hairpin turns on PVDE. According to the PSR (page 30) the current drainage condition results in an annual erosion rate of 5 feet per year. At this rate, within seven (7) years, or

2017 (from 2010), the erosion will remove 35 feet of land and the lower switchback in PVDE enters into a condition of instability and potential collapse. See Figures 1, 2, and 3.



**Figure 1** – San Ramon Canyon adjacent to PVDE lower and upper switchbacks.



**Figure 2** - San Ramon Canyon with PVDE, first hairpin turn to the far right of photo. The cost to reconstruct the lower switchback is estimated at \$8.7 million.



**Figure 3**- A closer view of the San Ramon Canyon streambed and its proximity to the lower switchback on PVDE. The road is expected to be in imminent danger of failure in 5-7 years because of erosion.

If the switchbacks on PVDE were to become a threat to health and safety for motorists and/or collapse altogether, it would be necessary to reconstruct PVDE (the switchback portions noted above in the visuals). To be conservative and account for dry years, the City engineers determined that for planning purposes, the reconstruction of the roads would probably occur in 2019. The total cost for the reconstruction of both switchbacks is estimated to be \$17.4 million (rounded).

Because the stabilization project requires the complete closure of PVDE for up to nine months assuming the project proceeds on schedule, the City will perform both stabilization projects at the same time even though it is likely that only the lower switchback would be in peril within seven years.

The rationale for reconstructing both the lower and upper switchbacks concurrently is to reduce the impact to the residents and businesses, and to capitalize on some economies of scale because of the project size and joint schedule. If the project is not completed, the road would also benefit from additional caissons being installed, however, since the caisson project would be required as part of the alternative projects avoided (Table 16) they are not included in Table 19 or this discussion to prevent double counting of benefits.

The engineering estimates, prepared by KOA Engineering, for the PVDE stabilization project is provided as follows:

### Reconstruction of PVDE Lower Switchback and Upper Switchback

#### Project Description:

- Move the radius point southwestwards using 140' radius
- This will make the road steeper, but this can be accommodated through regrading over 1,000'
- Install CIDH piles outside half the perimeter of the bend (25% of circle) = 275'
- Construct retaining wall above embankment
- Construct new 50' wide roadway right of way
- Reconstruct the sewer
- Construct road base and pavement
- Install guardrails, drainage, road markings etc.

Task	Description	Qty	Unit	Unit Cost	Total Cost
1	Mobilization and Clear and grub	1	LS	\$300,000	\$300,000
2	Remove debris from stream bed	10,000	cyd	\$60	\$600,000
3	Grade new road and bench	50,000	sf	\$0.85	\$42,500
4	Install CIDH pile restraining wall	300	ft	\$8,000	\$2,400,000
5	Construct retaining wall above road	200	ft	\$320	\$64,000
6	Install drainage inlet/outlet facilities	6	EA	\$15,000	\$90,000
7	Install drainage pipes	800	ft	\$200	\$160,000
8	Construct new roadway embankment	9,500	cyd	\$50	\$475,000
9	Construct base	40,000	sf	\$8	\$320,000
10	Pave roadway - AC	2,000	Tons	\$125	\$250,000
11	Install Guardrails	2,000	ft	\$50	\$100,000
12	Install markings	1	LS	\$20,000	\$20,000
13	Install sewer by-pass	1	LS	\$40,000	\$40,000
14	Maintain sewer by-pass	9	months	\$3,800	\$34,200
15	Install new sewer line	1,200	ft	\$150	\$180,000

\$5,075,700

Contingency 35% \$1,776,495

Premium for "emergency" work 10% \$507,570

**Total Construction Estimated Cost \$7,359,765**

Penalties for sewer spill 1 LS \$0

Environmental Permitting and Fees \$75,000



Geological investigation and Design cost	10%	\$735,977
Construction management and Inspection	7%	\$515,184
<b>SUBTOTAL PROJECT COST</b>		<b>\$8,685,925</b>
<b>Add: Estimate similar cost for Upper Switchback</b>		<b>\$8,685,925</b>
<b>TOTAL PROJECT COST (LOWER AND UPPER)</b>		<b>\$17,371,850</b>

Notes:

Estimate does not include costs for environmental mitigation.

The beneficiaries of this benefit would be the local and regional commuters who use PVDE as traffic circulation. This includes Marymount College which is located on PVDE.

The avoided cost of reconstructing PVDE is included in Table 19 in year 2019.

## 2. Avoided Debris Clean Up

During nearly every major storm event, PVDS/25<sup>th</sup> Street requires emergency response to keep the road open. Because the City of Los Angeles owns and maintains PVDS/25<sup>th</sup> Street at the mouth of the Canyon, they are responsible for clean up and debris removal. The City of Los Angeles also owns and maintains the only storm water drain (catch basin) that carries water underneath PVDS/25<sup>th</sup> Street down past the mobile homes and into the Pacific Ocean (see photos below).



**Figure 4** - This catch basin is the only stormwater drain that carries water underneath PVDS/25<sup>th</sup> Street down past the mobile homes and into the Pacific Ocean.



**Figure 5** - The catch basin is completely submerged in this photo.

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Historically, the Cities of Los Angeles and Rancho Palos Verdes have dealt with the storm water flood events through a combination of emergency road clearance, debris removal, and monitoring of erosion rates and landslide movement. On an annual basis, the City of Rancho Palos Verdes or the City of Los Angeles remove approximately 700 cubic yards of mud and debris from PVDS/25<sup>th</sup> Street on an emergency basis. This was verified by the City of Los Angeles through a staff report dated December 11, 2009, for authorization to submit a grant application to FEMA for their Pre-Disaster Mitigation Grant Program, (please reference Appendix B).

This means either during or immediately after a rain and storm water event, one of the cities provides a crew for PVDS/25<sup>th</sup> Street, provides traffic control, and then removes and hauls mud and debris from the street. Work may also include cleaning out the existing catch basin and flushing the pipes. This effort has been estimated to cost the cities approximately \$165,875 annually for labor and machinery, and an additional \$21,000 (estimated at \$30 per cubic yards; 700 cubic yards of debris x \$30 = \$21,000) for hauling debris to the landfill. To date neither city has been fined for water quality and sewage release violations, but the possibility does exist that such a fine may be levied in the event of a failure.

In preparation for this grant application, Mr. Lawrence Cuaresma, P.E., District Engineer for the City of Los Angeles, Department of Public Works (Bureau of Engineering at the Harbor District) provided real time cost estimates for a two-day storm water clean-up effort on December 20 and 21, 2010. Please see Table 1 for documentation of the costs provided by Mr. Cuaresma and Appendix A. For this application, the emergency cleanup costs are shown in full, up until the avoided debris basin is built, which would be in year 2015 if the San Ramon Canyon Stormwater Flood Reduction Project were not constructed. Assuming that the City's preferred project is not built and the avoided debris basin is developed, the City will no longer be required to support emergency cleanup and will schedule annual debris removal from the debris basin.

<b>Table 1</b> <b>Estimated Storm Water Clean-Up Costs</b> <b>Per Two-Day Storm Event</b>			
<b>City of Los Angeles</b> <i>Source: City of Los Angeles, Department of Public Works</i> <i>Estimate provided by Lawrence G. Cuaresman, P.E., District Engineer</i>			
Department	Assigned Personnel (Title)	Number Assigned	Total Cost (fully burdened)
Sanitation	Equipment Operators Wastewater Collection Workers II	Three (3) Eight (8)	\$21,200
Street Services	Equipment Operator Truck Drivers Lot Cleaning Supervisor	One (1) Three (3) One (1)	\$5,800
Engineering	Sr. Civil Engineer Civil Engineering Associate (II)	One (1) One (1)	\$1,625
<i>Sub-Total</i>			\$28,625
			x 3 events per year
<b>Total Los Angeles City Annual Labor Costs</b>			<b>\$85,875</b>
<b>City of Rancho Palos Verdes</b> <i>Source: Public Works/Engineering Department</i> <i>Estimate provided by Andy Winje, P.E.</i>			
Contractor Cost for Minimal Clean up (estimate one time per year)			\$5,000
Contractor Cost for Comprehensive Clean up (estimate \$30,000 x 2 times per year)			\$60,000
City of RPV staff time (annual)			\$15,000
<b>Total Rancho Palos Verdes Annual Contractor and Staff Labor Costs</b>			<b>\$80,000</b>
<b>Total Annual Labor (LA City and RPV)</b>			<b>\$165,875</b>

In addition to the labor costs cited above, the City of Los Angeles estimates the **annual clean up of debris is 700 cubic yards**. (Source: this estimate was cited in the City of Los Angeles' 2009 Pre-Disaster Mitigation Grant Program application submitted to the Federal Emergency Management Agency (FEMA) (please see Appendix B).

The debris consists of mud, packed dirt, sedimentation, loose gravel, tree branches and other Canyon material. Generally this material is hauled to the BFI / Falcon Refuse center 12 miles away. The one way travel time is approximately 30 minutes. Each cubic yard of debris costs roughly \$30 per cubic yard to haul and deposit at the facility (cost based on engineering estimates from public bids for debris removal) or \$21,000 annually (\$30 x 700 cubic yards = \$21,000).

Therefore the annual total estimated debris removal cost is \$186,875 (\$165,875 + \$21,000). This cost is shown in Table 19 for years 2009 through 2012. The costs are only shown through 2012 because if the preferred project is not constructed, it is assumed the debris basin will be constructed, along with three other complementary projects, which should eliminate the debris removal costs.



**Figure 6** – Almost 120 dump truck trips are paid for annually because of storm water events at the project site.



**Figure 7** – Another visual of heavy equipment to clean up mud, debris, etc. The City of Los Angeles estimates they clean up 700 cubic yards of debris annually.



**Figure 8**- San Ramon Canyon looking down onto Palos Verdes Drive South/25<sup>th</sup> Street. 242 mobile homes with more than 500 senior citizens are directly below.



**Figure 9** - “Mouth” of San Ramon Canyon looking down onto PVDS/25<sup>th</sup> Street. Stalled vehicles where traffic attempted to drive through.

### 3. Eliminate excessive road repaving and restoration on PVDS/25<sup>th</sup> Street

One unfortunate aspect of the emergency cleanup is that it is hard on the paved surface of PVDS/25<sup>th</sup> Street. While most road surfaces are slurry sealed approximately every seven years and may be resurfaced every 21 years unless heavily utilized, the added impact of emergency cleanup and flood damage requires repaving of PVDS/25<sup>th</sup> Street on a 15-year schedule. The City did not account for slurry seal or routine maintenance but did account for the repaving of the street at the accelerated schedule.





**Figure 10** - Emergency clean up estimated to accelerate the repaving schedule of PVDS/25<sup>th</sup> Street from 21 years to 15 years.



**Figure 11** - The clean up efforts take a toll on paving conditions and accelerates road repaving.

The estimated repaving and roadbed restoration cost is \$1,250,000 for year 2014, which includes roadbed failure work that the City of RPV would mitigate while repaving (\$700,000 for repaving and \$525,000 for roadbed restoration work). Repaving costs only are subsequently included in the balance of the project life in years 2027, 2042, and 2057. All costs were provided by KOA Engineering.

#### **4. Avoided Sewer Failure Fines**

One pending issue that has been avoided to date is the potential for water quality violations from the Regional Water Quality Control Board and others. Engineers estimate that there is a potential for a sewage spill or other finable event once every 15 years. Typical fines to cities for such events is approximately \$200,000 (fines are levied by the board for every day a violation exists and such fines can be retroactive). To be fair in this analysis, the City assumes that the probability of a fine is  $\$200,000 \times 0.07$  (the annual probability of a fine occurring). This amounts to an annual probable fine of \$14,000. The proposed project would eliminate the potential for fines resulting from sewage spill and greatly reduce the amount of sediment transported directly to the ocean, thereby helping the sensitive environmental preserves to the south.

All of the aforementioned costs were inputted into Table 19 – Water Quality and Other Expected Benefits to provide an annual present value of discounted benefits based on the unit value. Over the life of the project, the avoided debris clean up, road maintenance, fines, and road reconstruction has a present value of \$11.94 million (rounded). Without the project, or the projects avoided in Table 16, the cities would be required to invest in the stabilization projects and run the risk of exposure to fines.

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**Table 19 - Water Quality and Other Expected Benefits**

(All benefits should be in 2009 dollars)

Project: San Ramon Canyon Stormwater Flood Reduction Project

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit	Without Project	With Project	Change Resulting from Project	Unit \$ Value	Annual \$ Value	Discount Factor	Discounted Benefits
		(Units)			(e) – (d)	(1)	(f) x (g) (1)	(1)	(h) x (i) (1)
<b>2009</b>	Debris Cleanup / Annual Potential Fines	Annual \$	200875	0	-200875	\$1	-\$200,875	1.000	-\$200,875
<b>2010</b>	Debris Cleanup / Annual Potential Fines	Annual \$	200875	0	-200875	\$1	-\$200,875	0.943	-\$189,425
<b>2011</b>	Debris Cleanup / Annual Potential Fines	Annual \$	200875	0	-200875	\$1	-\$200,875	0.890	-\$178,779
<b>2012</b>	Debris Cleanup / Annual Potential Fines	Annual \$	200875	0	-200875	\$1	-\$200,875	0.84	-\$168,735
<b>2013</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.792	-\$11,088
<b>2014</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.747	-\$10,458
	Repaving / Restoration	\$/project	1250000	0	-1250000	\$1	-\$1,250,000	0.747	-\$933,750
<b>2015</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.705	-\$9,870
<b>2016</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.665	-\$9,310
<b>2017</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.627	-\$8,778
<b>2018</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.592	-\$8,288
<b>2019</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.558	-\$7,812
	PVDE Reconstruction	\$/project	17386925	0	-17386925	\$1	-\$17,386,925	0.558	-\$9,693,492
<b>2020</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.527	-\$7,378
<b>2021</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.497	-\$6,958
<b>2022</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.469	-\$6,566
<b>2023</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.442	-\$6,188
<b>2024</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.417	-\$5,838
<b>2025</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.394	-\$5,516
<b>2026</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.371	-\$5,194
<b>2027</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.350	-\$4,900
	Repaving 25th Avenue	\$/project	700000	0	-700000	\$1	-\$700,000	0.350	-\$245,000
<b>2028</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.33	-\$4,620
<b>2029</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.312	-\$4,368
<b>2030</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.294	-\$4,116
<b>2031</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.278	-\$3,892
<b>2032</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.262	-\$3,668
<b>2033</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.247	-\$3,458
<b>2034</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.233	-\$3,262
<b>2035</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.22	-\$3,080
<b>2036</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.207	-\$2,898
<b>2037</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.196	-\$2,744
<b>2038</b>	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.185	-\$2,590

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**Table 19 - Water Quality and Other Expected Benefits**

(All benefits should be in 2009 dollars)

Project: San Ramon Canyon Stormwater Flood Reduction Project

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit	Without Project	With Project	Change Resulting from Project	Unit \$ Value	Annual \$ Value	Discount Factor	Discounted Benefits
		(Units)			(e) - (d)	(1)	(f) x (g) (1)	(1)	(h) x (i) (1)
2039	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.174	-\$2,436
2040	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.164	-\$2,296
2041	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.155	-\$2,170
2042	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.146	-\$2,044
	Repaving 25th Avenue	\$/project	700000	0	-700000	\$1	-\$700,000	0.146	-\$102,200
2043	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.138	-\$1,932
2044	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.130	-\$1,820
2045	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.123	-\$1,722
2046	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.116	-\$1,624
2047	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.109	-\$1,526
2048	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.103	-\$1,442
2049	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.097	-\$1,358
2050	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.092	-\$1,288
2051	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.087	-\$1,218
2052	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.082	-\$1,148
2053	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.077	-\$1,078
2054	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.073	-\$1,022
2055	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.069	-\$966
2056	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.065	-\$910
2057	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.06	-\$840
	Repaving 25th Avenue	\$/project	700000	0	-700000	\$1	-\$700,000	0.06	-\$42,000
2058	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.058	-\$812
2059	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.055	-\$770
2060	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.053	-\$742
2061	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.050	-\$700
2062	Annual Potential Fines	Annual \$	14000	0	-14000	\$1	-\$14,000	0.048	-\$672
<b>Project Life: 51 years</b>									
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries									\$11,939,630
Comments:									

### **Other Benefits (not easily quantified)**

The following benefits will also be realized as a result of implementing the San Ramon Canyon Stormwater Flood Reduction Project:

1. Improved water quality;
2. Ecosystem restoration and enhanced open space/recreational use;
3. Improved traffic circulation and commute time during storm events;
4. Improved response time for first responders during storm events; and
5. Potential reduction in Tarapaca Landslide movement.

The benefits are not easily quantifiable and therefore a narrative discussion for each one is provided as follows:

### **Improved Water Quality**

During the development of this grant application, the City of RPV consulted with Ms. Susan Dworsky, Environmental Compliance Specialist familiar with the project site and its environmental habitat, for John L. Hunger and Associates (located in Buena Park, CA). Ms. Dworsky was asked to provide her professional opinion on how the preferred project would improve water quality. The following was provided by Ms. Dworsky:

“In the City of Rancho Palos Verdes (City), the San Ramon Canyon provides natural drainage for a residential and open space area at the southeastern border of the City. Currently, landslide induced rock and soil deposits in the Canyon bottom are being transported by moderate and heavy rainfall events down the canyon and into the receiving Santa Monica Bay. The effects of sediment in stormwater runoff on receiving water quality are both environmentally and economically costly. Sediment laden runoff can adversely affect water quality physically, chemically, and biologically. The sediment that is transported by stormwater runoff can carry organic matter, animal wastes, heavy metals, nutrients and pesticides. All of these pollutants bind to sediment particles and can pose significant threats to the quality of downstream waters. Substantial impacts from heavy sediment loading can range from direct effects on aquatic ecosystems, such as increased turbidity and algal blooms, to indirect threats to human health from toxic materials accumulating in fish tissue. The myriad effects on water quality from sediment laden runoff can introduce aquatic biota and public health concerns resulting in substantial impacts for municipalities both presently and in the future. The San Ramon Canyon Stormwater Flood Reduction Project will help alleviate environmental consequences by reducing sediment flow (and associated pollutants) to the Santa Monica Bay and Pacific Ocean.”



In addition, the construction of the preferred alternative will address water quality specifically related to first flush flows. The following was provided by Harris and Associates as part of the development of the Project Study Report:

“Although a significant amount of the project flows are from natural canyon runoff there are also residential roadways and PVDE runoff that are tributary along the top of the ridge. Presently, the “first flush” flows from the streets above are absorbed into the pervious natural canyon invert, which essentially eliminates the need for related water quality treatment systems to protect the runoff to the ocean. Further, as part of any design alternative pursued, a low flow diversion system will be incorporated into the mid-canyon inlet structure to allow “first flush” flows and other low flows to be conveyed to the natural canyon downstream so that the canyon creek bed does not become completely dry. Methods of interception of sediment and debris will also be reviewed as part of the design of the upstream inlet structure, with more stringent requirements for collection applying to any alternative outletting the County of Los Angeles storm drain in 25<sup>th</sup> Street. However, natural sediment that is generated by the canyon is not a pollutant, which is why any alternative outletting directly to the beach will allow “bulked” flows to pass. For the new beach outlet alternatives the conveyance of natural canyon sediment will reduce the amount of maintenance and debris removal required at the mid-canyon inlet structure.”

The photos below show the volume of clay and silted sediments that are regularly transported to the ocean or deposited on PVDS/25<sup>th</sup> Street. Please note the depth of the sedimentation and the heavy machinery used to remove the sediment and biological debris to the landfill.



**Figure 12** - More than a foot of mud and sludge can be deposited after a typical storm event.



**Figure 13** - Another view of the extent of debris.

## **Ecosystem Restoration and Enhanced Open Space and Recreation**

The proposed project will enhance open space and recreation by restoring the natural area down stream of the mid-canyon inlet structure, which is approximately 1.61 acres. Anticipating CEQA requirements, habitat will actually be restored to three times the acreage, or 4.83 acres. Re-vegetation of the streambed and affected canyon slopes with native vegetation will be conducted. Re-vegetation activity will include a plant palette, consistent with the Resource Agency and Native Plant Society criteria, that lists exact species of plants to be restored and the native plants to be used derived from local genetic sources.

The City will also restore and improve the casual trail that exists from PVDS to the bluff top (approximately 1,700 ft. x 20 ft = 34,000 sq. ft.), creating a “gateway” to this open space parcel. The trail will lead from the roadside parking area to the bluffs overlooking the ocean and provide access to informal bluff trails to the beach. The City is also in the process of evaluating the development of a trail through the project area to connect Shoreline Park with Friendship Park. This activity will be measured at the conclusion of construction by City personnel who will visually confirm/measure acreage restored, plants used, and that 34,000 sq. ft. of trail was created.

## **Improved Traffic Circulation and Commute Time During Storm Events**

There are two elements of road closure and the impact on local businesses and commuter travel that are difficult to quantify, yet cannot be ignored when examining the benefits of this project. In analyzing the impacts both the on-going storm water flood events and the impact future construction projects would have on local businesses and commuters, the City looked at a model created by Glen Weisbrod, Economic Development Research Group, and published by the Transportation Research Board (#1552, 1996) in January 2006.<sup>1</sup>

The model suggests that one must look at the local impacts of access change (in other words, when the road is closed, how are businesses affected and how do commuters get to their destination?). This includes looking at traffic and travel patterns/times, business profiles, vulnerability, and competing alternatives. A trip destination and traffic shift can then be calculated. RPV has elected to forego a comprehensive, qualitative analysis suggested by the model because the level of effort required to perform the calculation is not deemed cost-effective. However, a qualitative analysis is provided as follows:

### ***Storm-related road closure on Palos Verdes Drive South/25<sup>th</sup> Street***

PVDS/25<sup>th</sup> Street is classified as a principal arterial roadway (ADT of 10,500), which serves as a regionally significant East-West access route for the southern portion of the Palos Verdes Peninsula. City engineers verified that the road is closed approximately three times per year

A 25-year rainfall event will close this road for approximately two days to allow road crews to clear the mud and debris and ensure the operational safety of the road. Because of the topography of the Peninsula and limited transportation routes, when PVDS/25<sup>th</sup> Street closes, commuter traffic is impacted certainly more than other urban traffic in other municipalities. The map below illustrates the major

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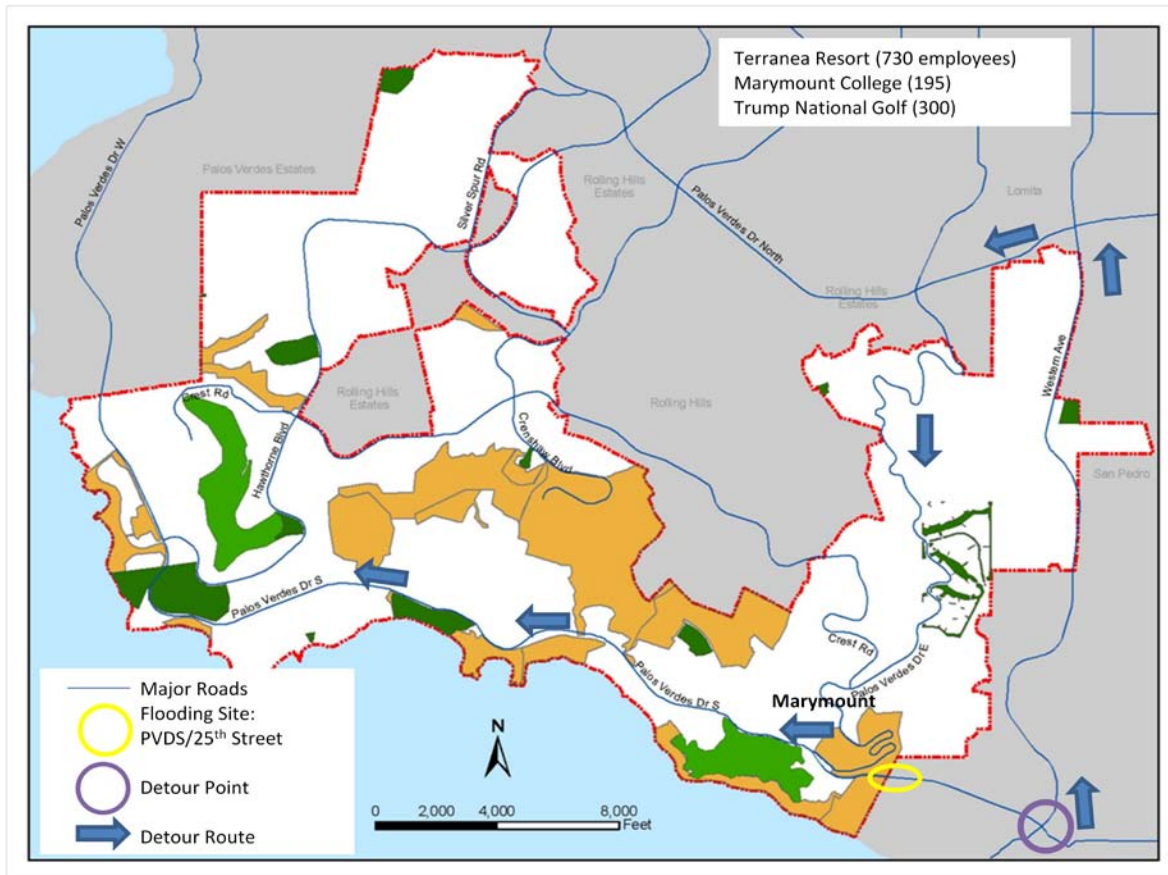
<sup>1</sup> Distinguishing the Broad and Local Impacts of Transportation Investments, Glen Weisbrod, Economic Development Research Group. Boston, MA. Paper produced as a working paper in June 2005 and subsequently published in the Transportation Research Record, #1552, 1996.

Prop 1E Stormwater Flood Management Grant

Rancho Palos Verdes: San Ramon Canyon Stormwater Flood Reduction Project

arterial roads on the Peninsula (PVDS, PVDE, Western Avenue, Crenshaw Avenue, Hawthorne Boulevard). The following table illustrates the distance in miles from the site of the flooding to the three of the City's top employers and the detour distance when PVDS/25<sup>th</sup> Street is closed:

Employer Rank (# of employees)	Employer Name/# of Employees	Distance in Miles West Bound Traffic		Distance in Miles East Bound Traffic	
		PVDS/25 <sup>th</sup> Street Open	PVDS/25 <sup>th</sup> Street Closed	PVDS/25 <sup>th</sup> Street Open	PVDS/25 <sup>th</sup> Street Closed
2	Terranea Resort Hotel (730)	4.7 miles	9.9 miles	No impact	No impact
3	Trump National Golf Club (300)	1.2 miles	6.3 miles	No impact	No impact
4	Marymount College (195)	2.4 miles	4 miles	6.7 miles	9.2 miles



### ***Reconstruction of Palos Verdes Drive East (PVDE)***

As noted in Table 19, Rancho Palos Verdes Drive East will eventually need to be stabilized in order to prevent the probable failure of the slope and subsequent closure of this critical road. RPV has already designed a stabilization project in the event that the preferred project is not completed.

Rehabilitation and stabilization of PVDE would require the road to be closed for nearly 9 months or more. This road is a major thoroughfare within the City. Closure of this road is likely to have undefined impacts on the businesses in the area. It is difficult to calculate the human response to detours and road closures so it is nearly impossible to develop direct economic impacts to the businesses and subsequent sales tax revenue to the City. A conservative impact would be the reduction of sales between 5% and 10% of annual sales for the businesses in the area.

### **Improved Response Time for First Responders During Storm Events**

When PVDS/25<sup>th</sup> Street is closed or traffic is being reduced to one lane only, emergency response times are vulnerable. The City contacted both the Los Angeles County Sheriff's Department and McCormack Ambulance Service to confirm if historical road closures have impacted their response times. Although, to date, there is no documented evidence that a life has been in imminent danger because emergency personnel were unable to get to their destination because of road closures on PVDS/25<sup>th</sup> Street, the possibility that this could happen cannot be ignored.

### **Potential Reduction in Tarapaca Landslide Movement**

The periodic debris associated with almost every storm runoff is significantly exacerbated by the Tarapaca Landslide (Figure 12). The Tarapaca Landslide is a known active landslide that had had slope failure as recently as 2000. The soft slope and sediments of the landslide provide a continuous source for new debris into the creek bed, which in turn is transported downstream to PVDS/25<sup>th</sup> Street. The storm runoff creates a cycle of undercutting along the toe of the Tarapaca Landslide and subsequent land movement refills the creek bed with newly loosened sediment and plant material.

The proposed project will mitigate the possibility of a full scale landslide/mudslide and is a benefit that must be included as part of the evaluation of the proposed project. Worldwide, devastating landslides can and do occur such as the January 2011 catastrophic mudslides in Brazil which killed nearly 500 people. In California millions of dollars in property damage and ten lives were lost in the La Conchita landslide of 2005. Although a failure of the Tarapaca Landslide is not likely to directly damage homes or take lives, the slide would create a natural earthen dam that may or may not be capable of withholding the storm water runoff. Failure of the earthen dam would result in a debris flow condition that would easily overwhelm the garden wall and potentially take lives and certainly destroy many of the mobile homes below.





**Figure 12** – Tarapaca Landslide and proximity to PVDE Switchbacks

**Appendices for Attachment 9**

Appendix A..... City of Los Angeles Clean Up Estimate for December 2010 Event

Appendix B.....City of Los Angeles Staff Report Referencing Annual Clean Up (Cubic Yards)

## **Appendix A**

Confirmation of clean up costs provided by the City of Los Angeles.

**From:** [Andy Winje](#)  
**To:** "Destin Blais"  
**Cc:** "Ron Dragoo"  
**Subject:** FW: FW: 25 Street photos  
**Date:** Tuesday, February 08, 2011 4:39:24 PM

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Destin – City of LA has provided their costs for the two day clean up event in December. Please note their costs do not include long distance hauling or disposal fees to their facility which could raise their costs by 50 to 100% or more.

*Andy Winje*  
RPV Public Works  
310-544-5249

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**From:** Lawrence Cuaresma [mailto:lawrence.cuaresma@lacity.org]  
**Sent:** Tuesday, February 08, 2011 4:24 PM  
**To:** Andy Winje  
**Cc:** Gordon Teuber; Ron Dragoo; Jones, Carlton; Shu, Susan  
**Subject:** Re: FW: 25 Street photos

Thanks for the pics Andy and sorry for the delay in the cost estimate. I've received fully burdened cost information from Sanitation and Street Services for the two day cleanup effort on 12/20/10 to 12/11/10.

Sanitation cost = \$21,200

Equipment Operators (3)  
Wastewater Collection Workers II (8)

Street Services cost = \$5800

Equipment Operator (1)  
Truck Driver (3)  
Lot Cleaning Supervisor (1)

Engineering = \$1625

Sr. Civil Engineer (1)  
Civil Engineering Associate III (1)

**Total = \$28,625 for a 2-day cleanup event**

Please note that haul-route times were less thanks to your city allowing our crews to dispose of debris at Abalone Cove Park and this estimate does not show the disposal fees that would have been paid if Sanitation had transported the debris to the BFI transfer station in Wilmington.

On Tue, Feb 8, 2011 at 11:24 AM, Andy Winje <[andyw@rpv.com](mailto:andyw@rpv.com)> wrote:



Larry - here are some photos of the recently completed work at 25th Street and San Ramon Canyon crossing performed by our contracted crews. The basin is now empty (relatively) and ready for the next storm.

Also, one last request for your costs (ballpark is fine) to clean up. We need to get our economic study completed for our grant application. Thanks.

Andy Winje  
RPV Public Works  
310-544-5249  
-----Original Message-----  
From: Emilio Blanco [mailto:[EmilioB@rpv.com](mailto:EmilioB@rpv.com)]  
Sent: Tuesday, February 08, 2011 11:09 AM  
To: 'Andy Winje'  
Subject: 25 Street photos

Attached are the 25 Street photos.

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

--  
Lawrence G. Cuaresma, P.E.  
District Engineer  
City of Los Angeles, Department of Public Works  
Bureau of Engineering, Harbor District  
638 S. Beacon Street, Room 402  
San Pedro, CA 90731  
(310) 732-4663  
(310) 732-4670, FAX

## **Appendix B**

Confirmation of annual clean up (cubic yards) per year by City of Los Angeles (see 3<sup>rd</sup> page of staff report, highlighted in yellow).

Department of Public Works

Bureau of Sanitation  
Bureau of Engineering  
Joint Board Report No. 1  
December 11, 2009

CD: 15

AUTHORITY TO APPLY FOR, ACCEPT, NEGOTIATE, AND EXECUTE AN AGREEMENT FOR GRANT FUNDING FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) 2009 LEGISLATIVE PRE-DISASTER MITIGATION (LPDM) PROGRAM FOR THE 25TH STREET DRAINAGE IMPROVEMENT PROJECT

RECOMMENDATIONS

1. Approve and forward this report forthwith, with its transmittals, to the Mayor and the City Council, with the recommendation that the City Council, subject to concurrence of the Mayor, authorize the City Engineer of the Bureau of Engineering (BOE) and the Director of the Bureau of Sanitation (BOS), or their designees, to apply for and accept FEMA LPDM grant funding [as Subgrantee] of the State of California Emergency Management Agency (CalEMA) [Grantee] in an amount not to exceed \$500,000; to conduct all negotiations; to provide additional information; and to execute and submit all documents, including, but not limited to, applications, agreements, or amendments through the City Administrative Officer [the City's Authorized Agent], which may be necessary to secure FEMA 2009 LPDM funding with respect to the 25th Street Drainage Improvement Project.
2. Instruct the BOE and BOS to coordinate with the City Administrative Officer (CAO), who is on file with CalEMA as the City of Los Angeles' Authorized Agent for disaster grants with respect to State and Federal disaster assistance pursuant to C.F. 02-2220, in executing and delivering any, and all, additional certificates, agreements, and other documents as may be required of the City in connection with obtaining the FEMA LPDM assistance for which the City is eligible to effect the design and construction of the 25th Street Drainage Improvement Project.
3. Request the City Council and Mayor to approve the use of City's staff costs as the matching funds for the implementation and completion of the 25th Street Drainage Improvement Project
4. Request the City Council and Mayor to instruct the CAO to reimburse the Bureau of Sanitation's Stormwater Pollution Abatement Fund (SPAF), upon certification of eligible expenditures by BOS in an amount not to exceed \$500,000, for the aforementioned project after processing all payments received from FEMA and CalEMA, after initial deposit into the City's Disaster Assistance Trust Fund (DATF).

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FISCAL IMPACT STATEMENT

Acceptance of this funding will have no impact on the City's General Fund. The total project cost is estimated at \$666,667.67, of which \$500,000 (75%) in funding will be made available through a 2009 LPDM reimbursement grant by FEMA. The remaining project costs of \$166,667.67 constitutes the City's twenty-five percent (25%) cost-share in the form of in-kind services for design, construction management and project management services. The salaries for the stated in-kind services provided by the City staff will be paid by the Stormwater Pollution Abatement Fund (SPAF). The total grant amount will also be front-funded through the SPAF. The City Administrative Officer will reimburse the SPAF from FEMA payments deposited to the (DATF) upon certification of expenditures by BOS.

TRANSMITTALS

1. A copy of the "Designation of Applicant's Agent Resolution", which designates the City Administrative Officer as the Authorized Agent for disaster grants with respect to State and Federal assistance for various disasters in the City of Los Angeles (Attachment 1).
2. A copy of Location Map (Attachment 2).
3. A copy of the 2009 LPDM Grant Application, submitted to FEMA electronically on September 24, 2009 (Attachment 3). In order to expedite processing and meet the application deadline, the CAO granted the BOE Project Manager temporary sign and submit rights to the FEMA e-grant application system for the 25th Street Drainage Improvement project.

DISCUSSION

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) allocated funds to the State of California [the grantee] for eligible projects falling under the purview of its Pre-Disaster Mitigation (PDM) Grant Program. Funding is provided to projects that assist States and local governments [subgrantees] in implementing cost-effective hazard mitigation activities that complement comprehensive mitigation programs, reduce injuries, loss of life, and damage and destruction of property. The PDM Grant Program, administered in California by the California Emergency Management Agency (CalEMA), was created when the Disaster Mitigation Act of 2000 amended the Stafford Act to provide a funding mechanism that is not dependent on a presidential disaster declaration.

The proposed 25th Street Drainage Improvement Project is located in Council District 15 on the border of the Cities of Los Angeles and Rancho Palos Verdes along 25th Street at San Ramon Canyon. The 25<sup>th</sup> Street is classified as a principal arterial roadway, which serves as a regionally significant East-West access route for the southern portion of the Palos Verdes Peninsula.



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An existing 42-inch diameter corrugated metal pipe (CMP) located underneath 25th Street conveys the run-off water from the San Ramon Canyon downstream where it outlets to the Pacific Ocean. Flooding and sediment accumulation during rain events causing street closure is a reoccurring problem along 25th Street at this location. The approximate annual clean up of debris is 700 cubic yards.

The Project will mitigate flooding at 25th Street by constructing a new standpipe with a maintainable inlet structure and will rehabilitate the existing 42-inch CMP which collects and conveys storm water flow below 25th Street from the San Ramon Canyon. In addition, 120 feet of curb and gutter, as well as other drainage improvements, would be constructed. As a result of the project, downstream residents will be protected from channel overflows that may cause flooding and the safety of motorists will be maintained during the rainy season, allowing for safe passage along 25th Street to and from the Palos Verdes Peninsula. With the current condition of the inlet structure, extensive coordination between BOS, BOE, the Bureau of Street Services, the County of Los Angeles and the City of Rancho Palos Verdes is needed for removal of debris in order to continually ensure the inlet is open. By implementing this project, the City will also reduce the City's liability of flooding downstream of the project location.

The total project cost is estimated at \$666,667.67, of which \$500,000 in FEMA funding has been legislatively earmarked for the City of Los Angeles. The grant award will cover all phases of the project implementation. The remaining project costs of \$166,667.67 constitutes the City's twenty-five percent (25%) grant cost-share in the form of in-kind services for grant administration, design construction management and project management services. The salaries of City staff for the stated in-kind services will be paid by the Stormwater Pollution Abatement Fund (SPAF).

Though the total grant amount will be front-funded by the SPAF, eligible expenditures will be reimbursed by the Legislative Pre-Disaster Mitigation (LPDM) Program under the Robert T. Stafford Emergency Assistance and Disaster Relief Act (Stafford Act). FEMA payments will be transferred to Bureau of Sanitation by the City Administrative Officer from the City's (DATF) upon certification of expenditures by BOS. Therefore, acceptance of this funding will have no impact on the City's General Fund.

Design is expected to be completed by August 2010 and construction is expected to be completed during Fiscal Year 2011-2012.

Ongoing debris catch basin maintenance costs will continue to be absorbed by the City unless other sources of funds are identified. The City of Rancho Palos Verdes and the County of Los Angeles fully support the project; however, neither entity can commit financial resources at this time. After completion, the project will be scheduled for routine catch basin cleaning.

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STATUS OF FINANCING

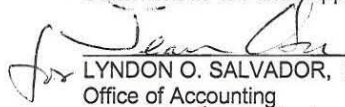
Funds in the amount of \$500,000 are available in Fund 511, Dept 50, Stormwater Pollution Abatement Fund. The Account number will be made available in future years through the budget process.

Respectfully submitted,

  
ENRIQUE C. ZALDIVAR, Director  
Bureau of Sanitation

  
GARY LEE MOORE, P.E., City Engineer  
Bureau of Engineering

Statement as to Funds Approved by:

  
LYNDON O. SALVADOR, Director  
Office of Accounting  
Date 12/10/09

Prepared by:  
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Deborah Washington, FMD  
(213) 485-2362